

Original Article

a comparative study between early enteral feeding (within 24 hours) versus conventional enteral feeding after enteric anastomosis

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Abstract

Background: Traditionally, enteric feeds are withheld for a period of 48-72 hrs, sometimes even more following enteric anastomosis depending upon return of full peristaltic sounds. This results in a period of non-stimulation of gut –‘Gut Rest’, which was supposed to result in better anastomotic healing. But this same also deprives the intestinal mucosa of surface nutrients as well as prolongs parenteral fluid therapy, thereby depriving the patients of adequate nutrition. Along with it, prolonged parenteral therapy also keeps the patients bound to bed with its resultant complications like, prolonged hospital stay and increased cost of therapy. **Objectives:** To compare the benefits of early enteral feeding over conventional enteric feeding following enteric anastomosis with special regards to patients recovery and complications. **Methods and materials:** The selection of patients into group A (60) and group B (60) was done after having fulfilled inclusion and exclusion criteria. Informed consent was obtained. The patients of group A were fed via enteral route within 24 hrs of enteric anastomosis. The patients of group B were fed via enteral route after 48-72 hrs or appearance of full peristaltic sounds following enteric anastomosis. These patients were followed in post operative period for their drain output, any nausea, vomiting or significant abdominal distension, prolonged ileus, post operative duration of hospital stay, post operative infective complications (e.g. wound infection, UTI, RTI), and different haematological and biochemical examinations. **Results:** This study shows that post operative nausea-vomiting, anastomotic leakage rate, re-exploration, wound infection and RTI rates are higher in group A than those of group B. In this study, the incidence of UTI in post operative period is higher in group B. But the differences in above mentioned variables are not statistically significant. Whereas appearance of intestinal peristaltic sound is earlier in group A (42.8 ± 10.68 hours) compare to that of group B (52.6 ± 13.46 hours). Here, the difference is statistically significant (p value = 0.00022) The duration of post operative hospital stay is shorter in group A (8.45 ± 5.143 days) than that of group B (10.533 ± 4.952 days). The difference of duration post operative hospital stay is statistically significant (p value = 0.0257). Removal of nasogastric tube, resumption of oral feeding, and passage of first flatus and/or defecation were earlier in the group A than that of the group B; the differences were statistically significant. The post operative day-5 albumin level is better in group A (3.147 ± 0.4409 gm/dl) than that of group B (2.935 ± 0.3124 gm/dl). This difference is also statistically significant (p value = 0.0029). There are three mortalities in group A whereas one mortality in group B. This difference in mortality in two groups is not statistically significant.

Key words: Early enteral feeding (within 24 hours); Conventional enteral feeding; Enteric anastomosis

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Introduction

After performing a gastrointestinal anastomosis, 'nil per mouth' in post-operative period, is a common practice. During the post-operative period, stomach is decompressed with a nasogastric tube and intravenous fluids are administered to maintain fluid-electrolyte balance and nutrition of body organs. As soon as gastric and intestinal ileus resolve, oral feeding is introduced. The rationale of 'nil per mouth' is not only to prevent postoperative nausea and vomiting, but also to protect the anastomosis and to allow it to heal before being stressed by food. Though it is not clear whether deferral of enteral feeding is beneficial, the evidence from different clinical studies and animal experiments demonstrate the advantage of initiating early enteral feeding. The small bowel recovers its peristaltic function within 4-8 hours of laparotomy, whereas stomach and colon recover after a longer period of dysmotility¹. Clinical trials show that feeding within 24 hours after laparotomy is tolerated and the nutrients are absorbed^{2, 3}. Gastrointestinal surgery in malnourished patients increases the post-operative morbidity and mortality⁴⁻⁷. So administration of enteral feeding within 24 hours of post-operative period in this group of patients reduce the post-operative morbidity and mortality by preserving the gut mucosal integrity, barrier function, IgA production, and normal flora resulting in reduction in septic complications. Thus early enteral feeding improves survival in patients with severe injuries, acute pancreatitis, inflammatory bowel disease, and liver transplantation. Comparing with the total parenteral nutrition (TPN), enteral nutrition (EN) is considered to be less expensive, safer and EN maintains nutritional, metabolic, immunological and barrier function of intestine^{8, 9}. Several clinical trials demonstrate advantages of EN over TPN after abdominal surgery in trauma patients in terms of fewer septic complications¹⁰⁻¹³. Experimental data in animals shows reduction of collagen content in anastomotic scar tissue with diminished quality of healing following¹⁴⁻¹⁶. Enteral feeding reverses mucosal atrophy induced by starvation¹⁷ and increases anastomotic collagen deposition and strength¹⁸, thus improves wound healing¹⁹. Finally, early enteral feeding may reduce septic morbidity and mortality after abdominal trauma²⁰ and pancreatitis²¹. On the other hand, TPN can ensure adequate provi-

sion of nutrients specifically when enteral feeding is not tolerated or in presence of short gut or high-output proximal gastrointestinal fistula. In critically ill patients, postpyloric feeding is believed to reduce the risk for macroaspiration; however, the incidence of microaspiration remains probably unaltered. Some studies show the safety of gastric feeding with concomitant administration of promotility drugs; these studies have been underpowered to reflect the occasional catastrophic event.

Materials and methods

A prospective comparative study was conducted on the patients admitted in emergency and elective surgical wards of MEDICAL COLLEGE AND HOSPITAL, Kolkata from April 2008 to March 2010. The patients were selected based on following inclusion and exclusion criteria. Written informed consent was obtained from all patients before enrolling them in the study. The patients did not give consent or incapable of understanding the required information, were excluded from the study.

Inclusion criteria- Patients undergoing gastric, small bowel, large bowel and uncomplicated simple biliary-enteric anastomosis (e.g. choledochoduodenostomy) on an emergency or elective basis.

Exclusion criteria-

1. The patients with ASA Grade of IV and V
2. Gross contamination of peritoneal cavity prior to surgery (visceral cavity rupture duration of more than 6 hours)
3. Re-laparotomies
4. Patients with organ failures
5. Immunocompromised patients
6. Patients requiring critical care
7. Patients age (<15 years and > 70 years)
8. Patients who do not consent to be included in the study

Sixty patients who underwent gastrointestinal anastomosis and uncomplicated simple biliary-enteric anastomosis (e.g. choledochoduodenostomy) on an emergency or elective basis were randomly assigned into two groups: group A and group B.

Group A consisted of 60 patients who were allowed oral feeds in the early postoperative period (within 24 hours after anastomosis)

Group B consisted of 60 patients who were kept "nil by mouth" in postoperative period. They were fed 48- 72 hrs after or sometimes even more following

enteric anastomosis depending upon return of full peristaltic sounds.

A detailed clinical history, clinical examination and relevant blood examinations (hemoglobin, serum total protein-albumin, and serum electrolytes) were performed in every case. Both the groups were received similar antibiotic prophylaxis with insertion of nasogastric tube (NGT), intravenous access and urinary catheter. All the patients included in the study were undergone operation under general anesthesia with similar operating principles (e.g. similar operating technique, suture ties and placement of intraabdominal drain).

In postoperative period, oral liquids (25ml/hr) were started within 24 hours of operation in group A with clamping the NGT and the feed was increased by 25ml/hr at 12 hours interval. When the patients started tolerating the liquid diet, NGT was removed and the semisolid diet and then normal oral diet were started to reach the nutritional goal (25 kcal/ kg/ day) as soon as possible. If patient could not tolerate the oral diet, the volume was reduced and if required, oral feeding was stopped for next 6-12 hours. NGT was reinserted as and when required.

In group B, the NGT was removed when the output was less than 20-30 ml/day and there was no paralytic ileus. The patient was gradually shifted from liquid to semisolid and then to solid normal diet. In case of intolerance to the feeds, the patients were managed in a similar manner as described above.

All patients were monitored regularly in postoperative period by health care personnel to note down the intolerance to oral feeds, time of NGT removal, time of resumption to normal oral feeds, time of appearance of intestinal peristaltic sounds, time of first passage of flatus and/or stool following operation, duration of postoperative hospital stay, development of different complications (leakage of anastomosis, intraabdominal sepsis, wound infection, wound dehiscence, respiratory tract infection, urinary tract infection, mortality), level of serum albumin and electrolytes. The leakage of anastomosis was detected by clinical examination (features of septicemia, distension of abdomen, change in character and measurement of drain output) and radiological investigations (USG, CT scan).

The clearance for the study protocol was taken from the Ethics Committee of MEDICAL COLLEGE AND HOSPITAL, Kolkata. The information obtained from this study was tabulated in a master

chart and then statistically analyzed, using standard statistical methods like mean, median, standard deviation, frequency, coefficients of correlation and dispersion. Comparative analysis of benefits of early enteral feeding (<24 hrs) on enteric anastomosis over that of the conventional delayed enteral feeding was done by using chi-square test and unpaired t-test. In this study, the chi-square test and unpaired student t test were used for the analysis of the qualitative variables and continuous variables, respectively. Analyses were performed using <http://www.openepi.com>.

Results and analysis

This prospectively conducted comparative study was carried out on 120 patients, meeting inclusion criteria, undergone gastrointestinal anastomosis either emergency or elective, in the dept. of General Surgery, Medical College Hospital, Kolkata from April 2008 to March 2010. Random selection of patients into group A (60) and group B (60) was done after having fulfilled inclusion and exclusion criteria. The group A was fed via enteral route within 24 hrs of enteric anastomosis. The group B was fed via enteral route after 48-72 hrs or appearance of full peristaltic sounds following enteric anastomosis. These patients were followed in post operative period for their drain output, any nausea, vomiting or significant abdominal distension, prolonged ileus, clinical leakage, infective complications, hospital stay. Mean age for group A was 38.183 yrs (SD- 11.9) and for group B was 36.233 yrs (SD- 12.877). Both the groups were comparable in respect to their age distribution ($p = 0.391$). In group A, out of 60 patients, 18 are females and 42 were males. In group B, out of 60 patients, 14 are females and 46 are males. In group A 30% of the patients were female, in group B only 23.33% patients were female. ($p = 0.41$). So, both the groups were comparable in respect to their sex distribution.

Twenty four cases in group A, 24 were done in emergency (40%) and in group B, 20 cases were done in emergency (33.33%). Both the groups were comparable in respect to their distribution as emergency and elective cases ($p = 0.45$). In group A, out of 60, cases only 24 cases (40%) were found to be malignant and in group B only 22 cases (36.67%) were found to be malignant. Both the groups are comparable in respect to their distribution as malignant and non-malignant cases ($p = 0.71$).

Early enteral feeding versus conventional enteral feeding

The mean preoperative hemoglobin levels in group A and group B were 9.692gm% (SD- 0.936) and 9.802 gm% (SD- 1.129), respectively. The mean preoperative albumin levels in group A and group B were 3.493gm/dl (SD- 0.468) and 3.427 gm/dl (SD- 0.474), respectively. Both the groups were comparable for their preoperative hemoglobin ($p = 0.5623$) and albumin ($p = 0.4443$) level distribution. The mean duration of operation for group A was 136 minutes (SD – 32 minutes), whereas the mean duration for group B was 128 minutes (SD – 26 minutes). The difference was not statistically significant ($p = 0.1355$).

During operative procedure, out of 60 patients in group A, only 12 patients were found to have gangrenous gut. Only 8 patients were found to have gangrenous gut in group B. Both the groups were comparable in respect to distribution of gangrenous gut ($p = 0.46$). In group A, out of 60 anastomoses, 11 anastomoses (18.33%) were done by using surgical staplers. In group B, out of 60 anastomoses, 16 anastomoses (26.67%) were done by using surgical stapler. Other anastomoses were done by hand-sewn method in both the groups. Both the groups were comparable for distribution of methods of anastomosis ($p = 0.28$).

Only three patients in group B and one patient of group A receive inhalational steroid therapy for asthma/COPD. Ten patients of group A and seven patients of group B received preoperative chemotherapy/radiotherapy for carcinoma involving sigmoid colon and rectum. So both the groups were comparable for distribution of patients receiving steroid therapy ($p = 0.61$) and preoperative chemotherapy/radiotherapy ($p = 0.6$).

In group A, there are nine patients who were suffering from different co morbid conditions. Among them, five patients were suffering from hypertension, three patients were suffering from diabetes mellitus and one patient was suffering from COPD. In group B, there are five patients who are suffering from different co morbid condition. Among them, one patient was suffering from hypertension and one patient was suffering from diabetes mellitus and the other three patients were suffering asthma/COPD. All the comorbid conditions were under controlled in every patient by oral medications and inhalational therapy.

So, both the groups (group A and group B) were comparable for their distribution of age, sex, emergency-elective cases, malignant-non malignant cases, presence of gangrenous gut, preoperative hemoglobin level, preoperative albumin level, stapled-hand sewn anastomosis, operative duration, receiving of steroid therapy, receiving of chemotherapy and co morbidities.

Post operative data

Out of 60 patients of group A, 12 patients (20%) developed post operative nausea and vomiting and in group B, 8 patients (13.33%) developed post operative nausea and vomiting. Though the incidence of post operative nausea-vomiting is high in the group A, but the difference of incidence between group A and group B is not statistically significant ($p = 0.46$). Most of the patients having nausea-vomiting in group A and all patients of group B, responded with conservative approach with nothing per oral for 6-12 hours. Only three patients of group A needed continuation of NGT drainage for more than 72 hours in post operative period. The mean time of removal of nasogastric tube (NGT) in group A patients was 48.8 hours (SD – 20.71), whereas in group B, it was 68 hours (SD – 17.77). The difference between the both groups, in regards of their mean time of removal of nasogastric tube, is statistically significant (p value = 0.00000028). The NGT was removed when the output was less than 20-30ml/day. In group A, the NGT was removed on second day in most of the cases (40%) and in 30% of cases, it was removed on first postoperative day. In 36.67% cases, the NGT was removed on second post operative day in group B, though, in most of the cases (43.33%), it was removed on third post operative day. The mean time of resumption of oral feeding in group A was 2.65 days (SD - 0.917), in group B, it was 3.4 days (SD – 0.867). The difference between two groups is statistically significant (p value = 0.00001055). Most of the patient of (53.33%) in group A resumed to normal oral diet on the second post operative day, while in group B, only 15% of the patients started oral intake on second post operative day.

Figure I (stock diagram) shows the distribution of time of appearance of IPS in both the groups. The mean time of appearance of IPS in group A and group B were 42.8 hours (SD- 10.68) and 52.6 hours (SD- 13.46), respectively.

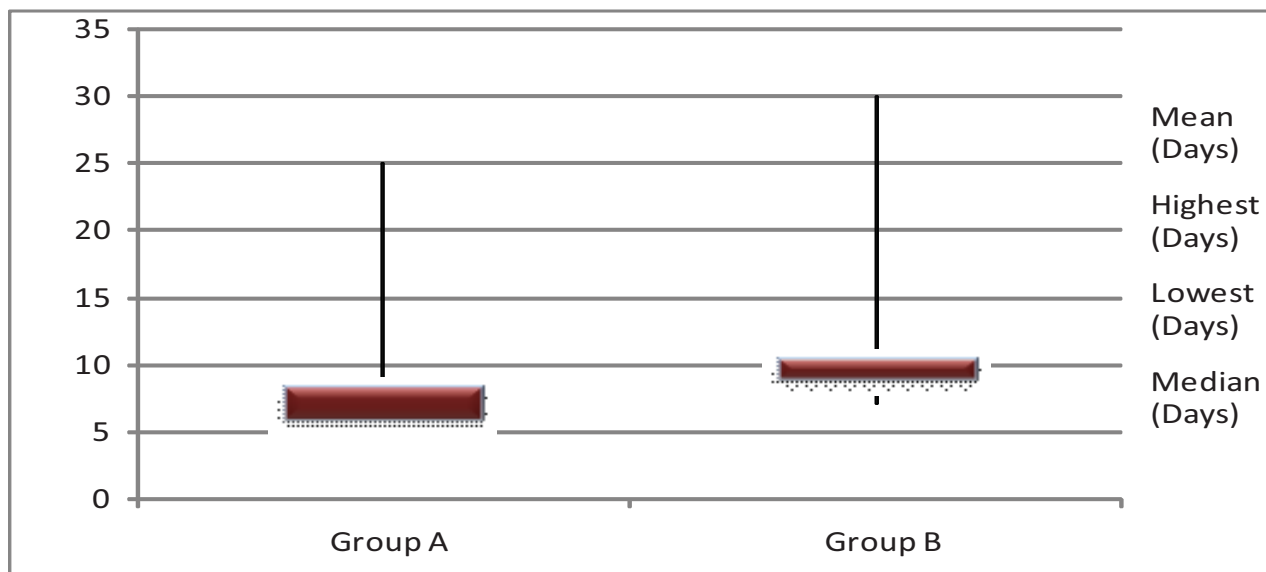


Figure 1: Distribution of time of appearance of IPS (in hours)

The time of appearance of IPS in group A is earlier than that of group B, which is statistically significant ($p = 0.000022$). The mean time of first passage of flatus and/or first defecation for group A is 49.63 hours (SD – 11.78) and that for group B is 56.55 hours (SD – 13.357). The difference of the mean time of first passage of flatus and/or first defecation between two groups is statistically significant ($p = 0.0032$).

Out of 60 patients in group A, 8 patients developed clinical evidence of leakage of gastrointestinal anastomosis. In group B, out of 60 patients, 3 patients developed clinical evidence of leakage of gastrointestinal anastomosis. The leakage rates of gastrointestinal anastomosis in group A and group B were 13.33% and 5%, respectively. The clinical leakage rate in group A is higher than that of group B, but the difference in clinical leakage rate in both the group is not statistically significant ($p = 0.206$). The number of the patients required re-exploration in group A and B are 4 and 1, respectively. The difference in rate of re-exploration required in both the group is not statistically significant ($p = 0.36$). The other patients in both the groups having the clinical leakage are treated conservatively by maintaining the fluid-electrolyte balance, nutrition, controlling the sepsis and radiological drainage of intraabdominal abscess as and when required.

In group A, 15 patients developed wound infection, whereas in group B, 8 patients developed only wound infection. The rates of wound infection in group A and group B are 25% and 13.33%. The rate

of wound infection is higher in group A than that of group B, but the difference in rate of wound infection in both the groups is not statistically significant ($p = 0.164$). In group A, 6 patients suffered from major wound infection and other 9 patients suffered from minor wound infection. In group B, 4 patients suffered from major wound infection and other 4 patients suffered from minor wound infection. Major wound infection requires repeated wound debridement and repair of wound dehiscence at operation room along with proper antibiotic therapy and regular dressing at wards, whereas minor wound infection requires regular dressing at wards with proper antibiotic therapy.

Ten patients of group A and 5 patients of group B were suffering from respiratory tract infection (RTI). The rates of RTI in group A group B are 16.67% and 8.33%, respectively. Five patients of group A and 8 patients of group B were suffering from urinary tract infection (UTI). The rates of UTI in group A group B are 8.33% and 13.33%, respectively. So, the rate of UTI is higher in group B than that of group A. So, the rate of RTI is higher in group A than that of group B, but reverse is true for UTI. The difference in rate of RTI and UTI in both the groups is not statistically significant (p value – 0.27 and 0.557, respectively).

The mean of post operative day-5 albumin level in group A and group B were 3.147 gm/dl (SD- 0.4409) and 2.935 gm/dl (SD- 0.3124), respectively. The mean of post operative day-5 albumin level in group A is higher than that of group B, which is statistically significant ($p = 0.0029$).

Early enteral feeding versus conventional enteral feeding

The mean duration of post operative hospital stay (day) in group A and group B were 8.45 days (SD- 5.143) and 10.533 days (SD- 4.952), respectively

(Figure II). The mean duration of post operative hospital stay (day) in group B is higher than that of group A which is found to be significant ($p= 0.0257$).

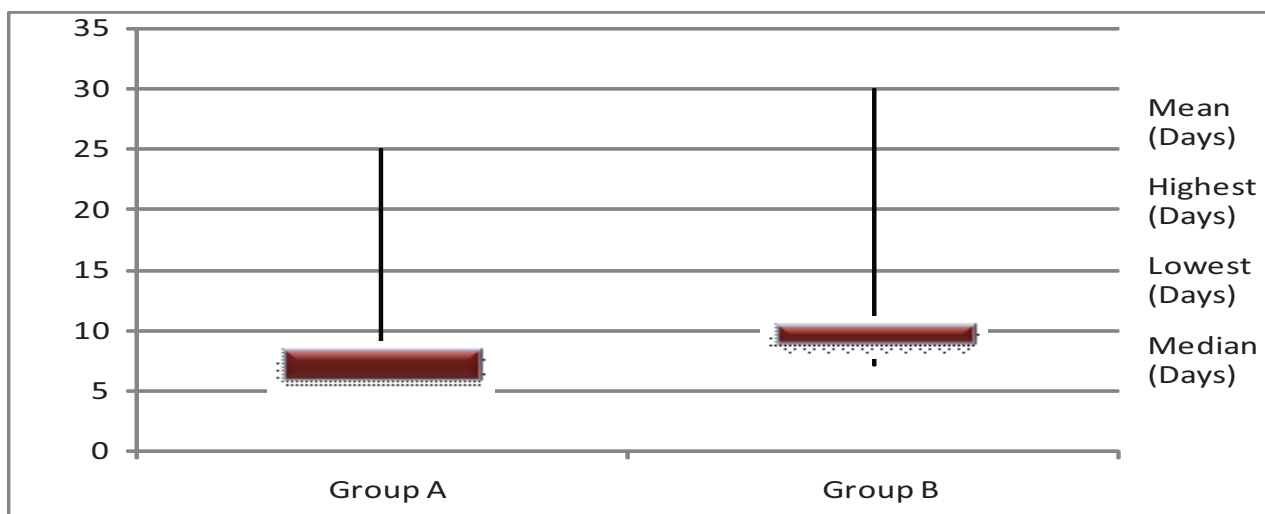


Figure II: Stock diagram shows the distribution of duration of postoperative hospital stay in both groups

There were three mortalities in group A, but only one mortality in group B. This difference of mortality in these two groups is not statistically significant (Yates corrected p value = 0.61). In group A, two patients and in group B,

one patient died due to severe sepsis following clinical leakage of gastrointestinal anastomosis. The other patient of group A died due to acute myocardial infarction with uncontrolled hypertension in post operative period.

Table I: Distribution of respondents according to socio-demographic profile

Variables	Group A (60)	Group B (60)	Test applied	p value
Age (Years)	Mean - 38.183 SD - 11.9	Mean - 36.233 SD - 12.877	Unpaired t- test (UT)	0.391
Sex distribution	Male - 42 Female - 18	Male - 46 Female - 14	Chi-square test (CT)	0.41
Distribution according to Emergency and Elective cases	Emergency - 24 Elective - 36	Emergency - 20 Elective - 40	CT	0.449
Distribution according to malignant (MC) and non-malignant cases (NMC)	MC - 24 NMC - 36	MC - 22 NMC - 38	CT	0.71
Distribution of preoperative hemoglobin (gm%) in patients of both the groups	Mean - 9.692 SD - 0.936	Mean - 9.802 SD - 1.129	UT	0.5623
Distribution of preoperative albumin (gm/dl) in patients of both the groups	Mean - 3.493 SD - 0.468	Mean - 3.427 SD - 0.474	UT	0.4443
Presence of gangrenous gut	12	8	CT	0.46
Anastomosis : stapled (S) versus hand-sewn (HS)	S - 11 HS - 49	S - 16 HS - 44	CT	0.28
Duration of operation (minutes)	Mean - 136 SD - 32	Mean - 128 SD - 26	UT	0.1355
Number of patients receiving steroid therapy	1	3	CT	0.61
Number of patients receiving preoperative chemotherapy/radiotherapy	10	7	CT	0.6

Table II: Distribution of respondents according to clinical manifestations

Variables (Outcome)	Group A (60)	Group B (60)	Test applied	p value
Nausea – vomiting	12 (20%)	8 (13.33%)	CT	0.46
NGT removal (Hours)	Mean – 48.8 SD – 20.71	Mean – 68 SD – 17.77	UT	0.0000028
Resumption of oral feeding (Days)	Mean – 2.65 SD – 0.917	Mean – 3.4 SD – 0.867	UT	0.00001055
Appearance of IPS (Hours)	Mean – 42.8 SD – 10.68	Mean – 52.6 SD – 13.46	UT	0.00002224
Passage of first flatus and/or defecation (Hours)	Mean – 49.63 SD – 11.78	Mean – 56.55 SD – 13.357	UT	0.0032
Incidence of clinical leakage	8 (13.33%)	3 (5%)	CT	0.206
Incidence of re-exploration	4	1	CT	0.36
Rate of wound infection and wound dehiscence	15 (25%)	8 (13.33%)	CT	0.164
Rate of Respiratory tract infection	10 (16.67%)	5 (8.33%)	CT	0.27
Rate of Urinary tract infection	5 (8.33%)	8 (13.33%)	CT	0.557
Post operative day 5 Albumin level (Gm/dl)	Mean – 3.147 SD – 0.4409	Mean – 2.935 SD – 0.3124	UT	0.0029
Postoperative hospital stay (Days)	Mean – 8.45 SD – 5.143	Mean – 10.533 SD – 4.952	UT	0.0257
Mortality	3	1	CT	0.61

Discussion

After gastrointestinal anastomosis patients are kept “nil by mouth” till the clinical evidence of return of intestinal peristaltic sounds (IPS). Withholding the oral feeds in postoperative period until return of IPS leads to deprivation of the intestinal mucosa from surface nutrients as well as prolongs parenteral fluid therapy, thereby depriving the patients of adequate nutrition and hence nutritional depletion of the patients’ body storage. Along with it, prolonged parenteral therapy also keeps the patients bound to bed with its resultant complications like, prolonged hospital stay and increased cost of therapy. Different studies on the role of early enteral feeding following gastrointestinal anastomosis demonstrated that early enteral feeding caused improved immunocompetence, decreased septic complications, improved wound healing and possibly improved anastomotic strength^{12,2 2,2 3,2 4}.

The mean age of the patients in group A was 38.183 (SD - 11.9) years and 36.233 (SD - 12.877) years in the group B and was comparable. In group A and group B, 30% and 23.33% patients were females respectively. These groups were comparable for the

distribution of emergency-elective cases, malignant-non malignant cases, presence of gangrenous gut, preoperative hemoglobin level, preoperative albumin level, stapled-hand sewn anastomosis, receiving of steroid therapy, receiving of chemotherapy and co morbidities.

In our study majority of the cases of both the groups undergone gastrointestinal anastomosis for closure of stoma (ileostomy / colostomy), malignancy of gut or trauma requiring resection and anastomosis of stomach, small gut and large gut. All the operations in both groups are done under general anesthesia with obeying similar operative principle in both the groups.

In this study, abdominal drain was put in all cases in group A and group B and the drain was taken out when the output was less than 20-30ml/day. Stewart et al had used intraabdominal drainage in their study on early feeding after elective open colorectal resections. Intraabdominal drainage was used in 40% cases of control group and 37% cases of study group²⁵. In our study, out of 8 cases (13.33%) in group A and 3 cases (5%) in group B who had postoperative

Early enteral feeding versus conventional enteral feeding

anastomotic leak, re-exploration was done in 4 patients in group A and 1 patient in group B. The drain was able to pick up all anastomotic leakage in both the groups and some cases of anastomotic leakage manifested as fecal/ bilious discharge from main abdominal wound or from drain site. Those cases were managed by formation of small or large bowel stoma. Other cases of leakage were managed by conservative treatment by maintaining the nutrition, fluid-electrolyte balance and controlling the sepsis and radiological drainage of intraabdominal abscess as and when required.

In our study, 5% cases in the group B and 13.33% cases in group A had anastomotic leak which was comparable ($p = 0.206$). In group A, out of 8 cases of intestinal leakage, two patients were undergone right hemicolectomy with ileo-colic anastomosis and in both the cases; the leakages in both the cases were managed by forming an ileostomy. Another three cases of intestinal leakage in group A were undergone ileo-ileal anastomosis for ileal perforation. Two of these patients were undergone re-exploration and ileostomy, and one patient died on the sixth post operative day due to severe sepsis following anastomotic leakage. One patient in the re-exploration group died on the second post operative day following the formation of ileostomy due to myocardial infarction with uncontrolled hypertension. Among the other three cases of intestinal leakage in group A, two cases were undergone left hemicolectomy and colorectal anastomosis; and one case was undergone side-to-side jejunostomy following blunt abdominal trauma; but the patient died on fifth post operative period due to septicemia. One case of leakage following colorectal anastomosis was managed conservatively as it formed a controlled external fistula without any feature of sepsis, and the other case required formation of proximal stoma (transverse loop colostomy). In group B, out of three cases of intestinal leakage, first case was undergone ileo-ileal anastomosis for ileal perforation due to abdominal tuberculosis. This case was managed by forming proximal ileostomy. Second case of anastomotic leakage occurred following colostomy closure. This case was managed conservatively as it formed a controlled external fistula without any feature of sepsis. The third case was of leakage following the ileo-colic anastomosis; the patient died of septicemia following intestinal leakage. Previous studies on early enteral feeding demonstrated better wound healing as well as anastomotic strength in the early oral feed-

ing group^{22,24}. In three studies conducted by Fanaie et al.²⁶, Ekingen et al.²⁷, Fukuzawa et al.²⁸ had demonstrated better anastomotic healing without any increase in anastomotic leakage and dehiscence in the early oral fed group. The result of our study is similar to that of the above mentioned studies.

Enteral feed was started within 24 hours of surgery in group A, which was well tolerated in 48 (80%) cases of group A. Remaining 12 cases (20%) of the group A could not tolerate early oral feeds. Oral feeding had to be withheld for next 6-12 hours in those patients, and then all the patients could tolerate feed in small quantities. Only three patients of group A needed continuation of NGT drainage for more than 72 hours in post operative period, and afterwards those patients tolerated feeds. Different studies on early enteral feeding, where the feeding was started within 48-72 hours of operation, had showed that patients could tolerate the early oral feeding^{25, 29, 30, 31}. The result of our study is comparable with that of previous studies. Due to persistence of residual effects of anesthetic drugs within 4 hours of surgery, the tolerance to early enteral feeding was only 65% of cases in the study conducted by Stewart et al, which was much less in comparison to the results of previous studies²⁵. So oral feeding can be initiated even within 24 hours of surgery provided the effect of the anesthetic drugs is over by that time. In our study, 20% of patients in group A and 13.33% of patients in group B complained of nausea and vomiting after the initiation of oral feeds which was comparable between two groups (p value = 0.46), though the incidence of nausea-vomiting was higher in the group A. The incidence of nausea-vomiting in our study is similar to that of the previous studies.

Two studies conducted by Zhou et al.³² and Huerta et al.³³ showed that routine placement of NGT was not necessary following intestinal anastomosis as an earlier return of bowel function, a decrease in respiratory complications with similar anastomotic leakage rate in both groups were noted without insertion of NGT. In our study, NGT was removed earlier in the group A than that of group B without any adverse consequences (p value < 0.05).

Intestinal peristaltic sounds appeared in a significantly shorter period of time in group A (mean 42.8 hours; SD- 10.68) as compared to group B cases (mean 52.6 hours; SD- 13.46) ($p < 0.05$). Fanaie et al

failed to demonstrate any statistically significant difference in the appearance of intestinal peristaltic sounds among the two groups in their study (0.5 0.6 vs. 0.5 0.5 days; $p=0.65$)²⁶. The time taken for first passage of flatus and/or first defecation was significantly shorter in group A (49.63 hours; SD – 11.78) than that of group B (56.55 hours; SD – 13.357) (p value = 0.0032). Kamei et al.³⁰ and Velez et al.³⁴ showed that early enteral feeding caused faster recovery of bowel function and hence shorter duration of hospital stay.

Serum albumin level estimation was done twice in our study – one in preoperative period and another on the day-5 in post operative period in all patients of both the groups. Values of the preoperative serum albumin were comparable among cases of two groups ($p>0.05$). In our study, in postoperative day-5 serum albumin values were significantly more in group A (3.147 gm/dl; SD – 0.4409) as compared to group B (2.935 gm/dl; SD – 0.3124) (p value = 0.0029). This improvement in nutritional status of patients of the group A is possibly due to early oral feeding.

In our study, 15 cases (25%) in group A and 8 cases (13.33%) in the group B had wound infection; the difference was not statistically significant (p value = 0.164). The group A patients had higher incidence of wound infection in this study, whereas the results of meta-analysis of 11 studies by Lewis et al showed lower incidence of wound infection in early fed group ($p=0.074$)³⁵. In the meta-analysis, as well as in our study, there was no statistical difference between the incidences of wound infection in both the groups. The numbers of patients suffering from major wound infection including wound dehiscence were 6 and 4 in group A and B, respectively. Minor wound infections were treated with regular dressing and proper antibiotic therapy, while the wound dehiscence and other major wound infection were required repair of wound dehiscence and repeated debridement with antibiotic therapy, respectively. Few cases of postoperative respiratory tract infec-

tions (group A - 16.67%; group B – 8.33%), urinary tract infections (group A – 8.33%; group B – 13.33%) were encountered in both the groups and on statistical analysis there was no significant difference between two groups. In the meta-analysis conducted by Lewis et al showed no statistically significant in the incidence of pneumonia and intraabdominal abscess in both groups though the incidence was less in early fed group patients ($p=0.85$ & 0.84 respectively)³⁵.

In this study, the mean duration of postoperative hospital stay was 8.45 days (SD – 5.143) in group A and 10.533 days (SD – 4.952) in the group B and the difference was statistically significant (p value = 0.0257). The result of our study is comparable with that of previous studies in respect to the duration of hospital stay^{36, 37}. So, early enteral feeding helps in early bowel movements, faster recovery, less postoperative complications, thus early discharge from the hospital.

Conclusion:

The following inferences can therefore be drawn from this study:

Appearance of intestinal peristaltic sounds and passage of first flatus and/or defecation earlier in the early enteral fed group.

Removal of NGT and initiation of oral feeds are earlier in the early enteral fed group.

Mean duration of post operative hospital stay is lower in the early enteral fed group.

Mean post operative day-5 albumin level is higher in early enteral fed group.

The rate of infective complications (UTI, RTI, Wound infections) is equal in both the groups.

The rates of clinical leakage, nausea/vomiting are equal in both groups.

The rate of re-exploration for anastomotic leakage is equal in both the groups.

On the basis of the above findings, we can safely conclude that the conventional wisdom of withholding enteral feeds for prolonged periods to coincide with the appearance of peristaltic sounds might not stand the test of time.

Early enteral feeding versus conventional enteral feeding

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